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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P200200947WO	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/DK 03/00246	International filing date (day/month/year) 11.04.2003	Priority date (day/month/year) 14.06.2002
International Patent Classification (IPC) or national classification and IPC C10M175/00		
Applicant OILCARE APS et al.		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p style="margin-left: 20px;">a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau a total of 5 sheets, as follows:</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p style="margin-left: 20px;">b. <input type="checkbox"/> (sent to the International Bureau only) a total of (Indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>		
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>		
Date of submission of the demand 06.08.2003	Date of completion of this report 28.09.2004	
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Plaka, T Telephone No. +31 70 340-2325 <div style="text-align: right;">  </div>	

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/DK 03/00246

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-12 as originally filed

Claims, Numbers

1-34 received on 27.04.2004 with letter of 27.04.2004

Drawings, Sheets

1/1 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-34
	No: Claims	
Inventive step (IS)	Yes: Claims	1-34
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-34
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(SEPARATE SHEET)**

International application No.

PCT/DK 03/00246

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1: EP-A-0 381 355 (FILTERCORP INC) 8 August 1990 (1990-08-08)

Document D1, which is considered to represent the closest prior art, discloses a process and associated apparatus for purifying used cooking oil comprising prefiltering the oil and then passing the prefiltered oil through a filtering unit in which the filtering medium comprises a pad made of cellulose fibres and carbon particles adhered to each other by a binder. The fibre pad is supported on a metal net. A pump is used to force the oil through the treatment steps. The carbon particles are used for the removal of the substances giving odour and colour to the used oil.

The subject-matter of process claim 1 differs from the process of D1 in that a) it is aimed for the purification of waste oil or rerefined oil from mineral or synthetic oil and b) in that the temperature of the prefiltrated oil is lowered before passing through the filtering unit.

The subject-matter of apparatus claim 18 differs from the apparatus of D1 in that cooling means are provided for cooling the prefiltrated oil.

The subject-matter of claims 1 and 18 is therefore new (Article 33(2) PCT).

Cooling the prefiltrated oil before entering the filtering unit was found to result in better purification in the case of waste and re-refined oils. Lowering the temperature provides a better contact between the filter media and the fluid, thus allowing the fluid to absorb/filter off a larger amount of the residues. There is no indication in the prior art of such an effect and given that the prior art focus on elevation of the temperature, it is most unexpected that the solution to the problem is found by lowering the temperature.

Therefore, the subject-matter of claims 1 and 18 involves an inventive step (Article 33(3) PCT)

Claims 2 to 17 and 19 to 33 are dependent on claims 1 and 18 respectively and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Use claim 34 is also novel and inventive as it refers to the use of the novel and inventive apparatus of the invention.

Re Item VII

Certain defects in the international application

Independent claims 1 and 18 are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art (document D1) being placed in the preamble (Rule 6.3(b)(I) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

Re Item VIII

Certain observations on the international application

1.

It is clear from the description on page 7 that the prefiltrated oil is cooled if it is in a heated condition when it reaches the filtering unit. It is therefore essential to the definition of the invention that the oil is cooled to a temperature of 10-30°C.

Since independent claim 1 does not contain this feature, it does not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

2.

Part of the description does not fall within the scope of the claims. This inconsistency between the claims and the description leads to doubt concerning the matter for which protection is sought, thereby rendering the claims unclear, Article 6 PCT.

Patent Claims: (AMENDED 27 April 2004)

1. A process for purification of waste oil or re-refined oil from mineral or synthetic oil comprising the steps of:
5

- prefiltrating said oil,
- lowering the temperature of the prefiltrated oil and subsequently passing the prefiltrated oil through a filtering unit in which the filter medium
10 comprises organic fibres and carbon particles, said organic fibres and carbon particles being adhered to each other by a binder.

2. A process according to claim 1, wherein the oil is prefiltrated by passing the oil through one or more
15 prefiltration units.

3. A process according to claim 1, wherein the oil is prefiltrated by passing the oil through three
20 prefiltration units.

4. A process according to claim 3, wherein the first prefiltration unit is trapping particles bigger than approximately 12 μm , the second prefiltration unit is
25 trapping particles bigger than approximately 6 μm , and the third prefiltration unit is trapping particles bigger than approximately 1 μm .

5. A process according to any one of the claims 1-4,
30 wherein the prefiltration units remove particles with decreasing sizes in the direction of the flow.

6. A process according to any one of the claims 1-5, wherein the prefiltration is performed by using a filtering medium made of glass fibres.
- 5 7. A process according to any one of the claims 1-6, wherein the prefiltrated oil is passed through one or more filtering units.
- 10 8. A process according to any one of the claims 1-7, wherein the filtering medium in the filtering unit contains 5-95% carbon based on the weight of carbon particles and organic fibres.
- 15 9. A process according to any one of the claims 1-8, wherein the fibres in the filtering unit are natural fibres preferably cellulosic fibres.
- 20 10. A process according to any one of the claims 1-9, wherein the binder is a positively charged resin.
- 25 11. A process according to any one of the claims 1-10, wherein the organic fibres, the carbon particles and the binder are in the form of a filtering plate.
- 30 12. A process according to claim 11, wherein the filtering plate is supported downstream by a net, preferably a net of plastic or steel.
13. A process according to any one of the claims 1-12, wherein the oil is passed through one or more vacuum units after passing through the prefiltration units and before passing through the filtering unit.

14. A process according to any one of the claims 1-13, wherein the oil is heated to a temperature of 50-90°C before passing the prefiltration units.

5 15. A process according to any one of the claims 1-14, wherein the oil is cooled immediately before passing through the filtering unit.

10 16. A process according to claim 15, wherein the oil is cooled to a temperature of 10-30 °C.

15 17. A process according to any one of the claims 1-16, wherein the oil is forced through the treatment steps by the use of a pump.

18. An apparatus for the purification of waste oil or re-refined oil from mineral or synthetic oil by a process according to any one of claims 1 - 17 comprising

- 20 • means for prefiltrating said oil,
- means for cooling the prefiltrated oil and
- a filtering unit in which the filtering medium comprises organic fibres and carbon particles, said organic fibres and carbon particles being adhered to each other by a binder

25 19. An apparatus according to claim 18, wherein the filtering medium in the filtering unit contains 5-95% carbon based on the weight of carbon particles and fibres.

30 20. An apparatus according to claim 18 or 19, wherein the fibres in the filtering unit are natural fibres, preferably cellulosic fibres.

21. An apparatus according to any one of the claims 18-20, wherein the binder is a positively charged resin.
- 5 22. An apparatus according to any one of the claims 18-22, wherein the organic fibres, the carbon particles and the binder are in the form of a filtering plate.
- 10 23. An apparatus according to claim 22, wherein the filtering plate is supported downstream by a net preferably made of plastic or steel.
- 15 24. An apparatus according to any one of the claims 18-23, wherein said means for prefiltrating comprises one or more prefiltration units.
- 20 25. An apparatus according to claim 24, wherein said prefiltration units remove particles with decreasing size in the direction of the flow.
26. An apparatus according to any one of the claims 18-25, wherein the prefiltration means comprise three prefiltration units.
- 25 27. An apparatus according to claim 26, wherein the first unit is trapping particles bigger than approximately 12 μm , the second prefiltration unit is trapping particles bigger than approximately 6 μm , and the third prefiltration unit is trapping particles
- 30 bigger than approximately 1 μm .

28. An apparatus according to any one of the claims 18-27, wherein the prefiltrating means comprise filters with a filter medium made of glass fibres.
- 5 29. An apparatus according to any one of the claims 18-28, wherein said apparatus comprises one or more vacuum units, said vacuum units being placed in the direction of the flow immediately after the prefiltrating means.
- 10 30. An apparatus according to any one of the claims 18-29, wherein a heater is placed in the direction of the flow immediately before the prefiltrating means.
- 15 31. An apparatus according to any one of the claims 18-30, wherein a cooler is placed in the direction of the flow immediately before the filtering unit.
- 20 32. An apparatus according to any one of the claims 18-31 comprising an additional filter, said filter being placed in the direction of flow after the filtering unit.
- 25 33. An apparatus according to any one of the claims 18-32 comprising a pump preferably for forcing the oil through the treatment steps.
- 30 34. Use of an apparatus according to any one of the claims 18-33 for the purification of waste oil or re-refined oil from mineral or synthetic oil.